

Effect of Time of Marcotting and Excising on Sugarcane Root Development and Stalk Survival

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ABSTRACT

An experiment, using sawdust and transparent polythene sheet, was conducted to determine the effect of time of marcotting and excising of sugarcane root-development and stalk survival. Marcotting started from 20th October, with an interval of seven days and continued up to 17th November, 1983. Excising started from 27th October, 1983 and continued till 22nd December, 1983 at a weekly interval. Marcotting from 20th October to 3rd November was found to produce maximum number of roots while excising within 3-4 weeks of marcotting showed better survival of stalks under SRTI conditions.

INTRODUCTION

The arrows used for sugarcane hybridization are needed to keep alive for more than one month. For this purpose, marcotting is used (Tysdal, 1956). This develops roots which help the excised stalks to remain alive through absorption of water. This method is practicable only on varieties which flower freely (Anonymous, 1960). Now-a-days, this technique is being used in all sugarcane breeding programmes all over the world. In marcotting, the desirable stalks are tied-up with rooting media and polythene sheet in the field and in potted canes. Later on, after root emergence, the stalks are excised when the arrows just start bursting. The excised stalks are then set for crossing under a cross-ing-shed to perform cross-pollination. No work has still been done in Bangladesh on time of marcotting & excising. Therefore, an experiment was conducted on time of marcotting and excising of sugarcane and their subsequent effect on root development and stalk survival.

MATERIALS AND METHOD

Sawdust and transparent polythene sheet was used as rooting media and wrapping material, respectively in marcotting of sugarcane. The variety used was Isd. 16. Marcotting started on 20th October, 1983 and was done for five times with an interval of seven days. Every time a number of 30 stocks were marcotted covering three nodes above the fourth node from the base. Altogether, 150 stalks were marcotted in five tying dates. During marcotting complete water-soaked sawdust was placed around the selected

stalks which were then covered with transparent polythene sheet and tied with rope. The quantity of sawdust used for different stalks was approximately the same. The stalks were not watered after marcotting till excising.

Excising started just after seven days of marcotting. In this way it was started on 27th October, 1983 and continued upto 22nd December, 1983. Each time 6 canes were excised from each tying. As a result, it took five excising dates to complete the 30 stalks of one tying. Among the 6 excised canes, 3 were placed in running tap water under crossing-shed to assess their survival days and the rest 3 were used to count the number, length and weight of roots. For this purpose, total number of roots were counted from upper two nodes, 20 roots were selected randomly to measure their length (cm) and finally all the roots of the two nodes were weighed. In respect of survival, the number of days were recorded starting from the date of placement of the marcotted stalks in water trough and continued till their death (marked by yellowing of flagleaf). The data were statistically analysed.

RESULTS AND DISCUSSION

The results obtained on different parameters of the experiment are discussed below.

Number of roots : The mean number of roots decreased with the increased time of marcotting with exception on 27th October (Table 1). The stalks of 27th October produced maximum number of roots and did not differ from the number of 20th October and 3rd November marcotting. On the other hand, the mean number of roots increased

Table 1. Mean number of roots developed at different times of marcotting and excising in sugarcane.

Time of marcotting	Number of roots					Mean
	First excise	Second excise	Third excise	Fourth excise	Fifth excise	
20th October	20.67 abcdefg*	33.00 defghi	44.00 hi	29.83 cdefghi	39.33 ghi	33.97 b
27th October	24.83 bcdefgh	42.83 hi	32.87 defghi	38.83 ghi	34.17 defghi	34.67 b
3rd November	16.50 abcdef	34.83 efghi	24.92 bcdefgh	36.00 fghi	49.67 i	32.33 b
10th November	0.50 a	9.33 abc	13.67 abcd	19.17 abcdefg	13.82 abcde	11.07
17th November	0.00 a	0.67 a	5.33 ab	16.33 abcdef	3.50 a	4.77 a
Mean	12.50 a	24.13 b	24.16 b	28.03 b	28.10 b	

* Figures accompanied by the same letter do not differ significantly at 5% level as per DNMR test.

with the increase of excising time. Fifth excise of 3rd November marcotting was found to produce maximum number of roots. Significantly lower number of roots were produced

by the 10th and 17th November, i. e., after 3rd November marcotting. This decrease in rooting might be due to over maturity of cane as well as fall of temperature.

With a few exceptions, it was observed that generally maximum number of roots were developed between 2nd and 3rd week of marcotting (Table 1). Similar resulsuts were reported by Groot and George (1962),

Length of roots : The mean length of roots increased, except two, with the increase of marcotting and excising time (Table 2). Maximum root length was attained by 27th October followed by 3rd November marcotting. The fifth excise of 27th October showed

Table 2. Mean length of roots formed at different times of marcotting and excising in sugarcane.

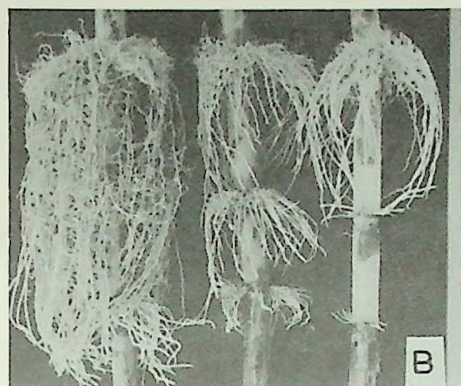
Time of marcotting	Length of roots (cm)					Mean
	First excise	Second excise	Third excise	Fourth excise	Fifth excise	
20th October	0.61 ab*	2.64 ab	12.89 abcde	13.74 bcde	11.83 abcde	8.34 ab
27th October	1.59 ab	14.12 bbcd	7.95 abcd	11.88 abcde	23.63 e	11.84 b
3rd November	2.06 ab	6.35 abc	6.49 abc	19.50 cde	20.95 de	11.07 b
10th November	0.03 a	0.62 ab	5.52 ab	9.16 abcd	8.94 abcd	4.86 a
17th November	0.00 a	0.65 ab	4.63 ab	8.38 abcd	3.07 ab	3.35 a
Mean	0.86 a	4.88 ab	7.50 bc	12.53 cd	13.68 d	

* Figures with common letter do not differ significantly at 5% level as per DNMR test.

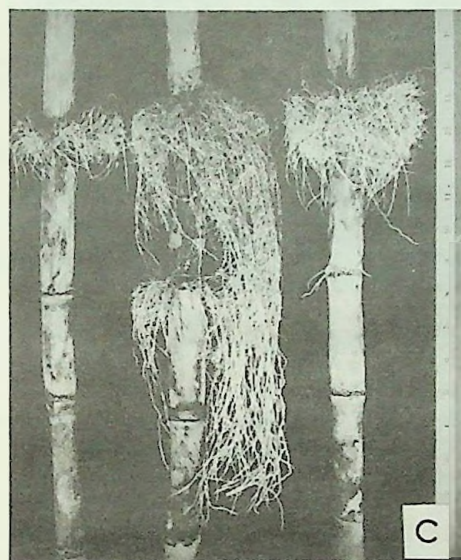
maximum root length. A marked decrease in length was observed in all excising dates after 3rd November marcotting. This discrepancies in root length were due to abnormal growth of root from different nodes of different stalks which might have been affected by differences of age of the marcotted stalks. The low temperature may have adversely affected the root development. The results were in partial conformity with the findings of Miah and Mannan (1983) where they found increased root length with increase of excising time.

Weight of roots : The weight of roots per node was the highest at the 20th October followed by 3rd November and 27th October marcotting (Table 3). With the increase of excising time the mean weight also increased. Maximum root weight per node was observed at the fifth excise of 3rd November marcotting. Likewise number and length, a considerable decrease regarding root weight was observed after 3rd November marcotting.

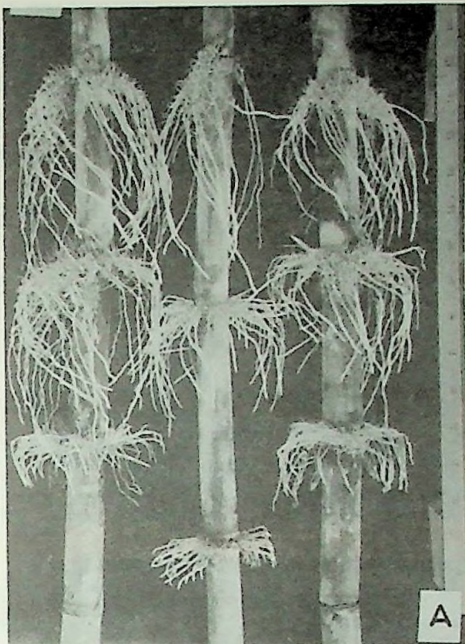
In some cases, it was observed that increased root number (Table 1) and length (Table 2) or even both of them (Tables 1 and 2) did not increase the weight proportionately



B



C



A

Figure 1. Root development at third week of marcotting.

- (A) 20th October
- (B) 27th October and
- (C) 3rd November.

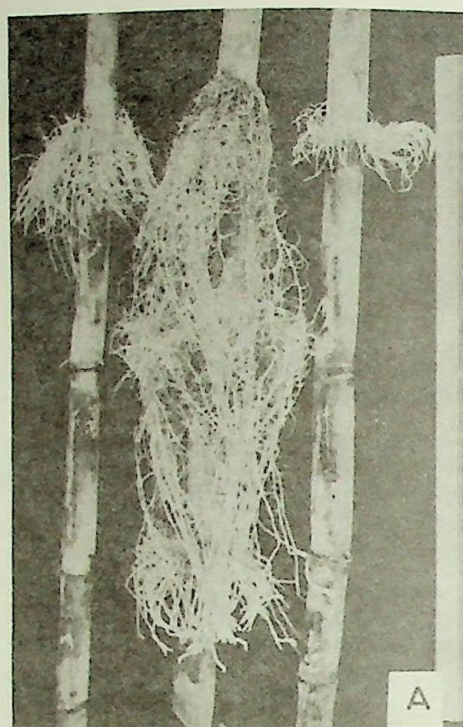
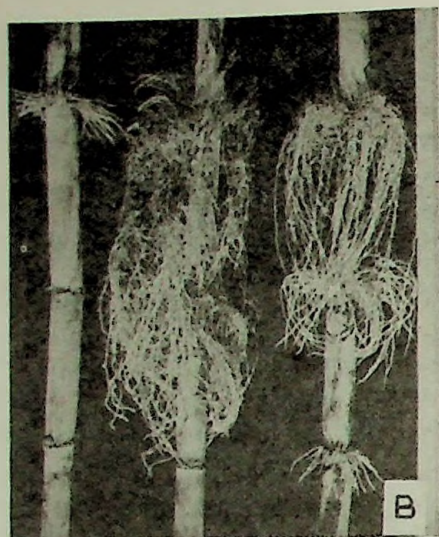


Figure 2 Root development at fourth week of marcotting.

- (A) 20th October,
- (B) 27th October and
- (C) 3rd November.

which may be due to less root number or short root or narrow root formation. This discrepancies were also supported by Miah and Mannan (1983) where they found decreased root weight in spite of increased length.

Table 3. Mean weight of roots grown at different times of marcotting and excising in sugarcane.

Time of marcotting	Weight of root (kg.)					Mean
	First excise	Second excise	Third excise	Fourth excise	Fifth excise	
20th October	0.20 ab*	0.70 abc	7.22 bcd	7.68 cd	5.69 abcd	4.30 b
27th October	0.78 abc	3.07 abc	2.30 abc	3.27 abc	6.68 abcd	3.22 ab
3rd November	0.40 ab	1.47 abc	2.19 abc	4.71 abcd	9.90 d	3.73 b
10th November	0.00 a	0.03 a	0.71 abc	1.67 abc	1.17 abc	0.72 a
17th November	0.00 a	0.005 a	0.07 a	3.08 abc	1.27 abc	0.89 a
Mean	0.28 a	1.05 a	2.10 ab	4.28 bc	5.14 c	

*Figures with common letter do not differ significantly at 5% level as per DNMR test.

Stalk survival : Generally, the excised stalks remained alive for increased number of days upto third excise of different marcotting dates and showed a decline from the fourth excise with few exceptions (Table 4). This short duration of survival, in spite

Table 4. Mean survival of stalks excised at different times from marcottes at different times.

Time of marcotting	Number of days Survived					Mean
	First excise	Second excise	Third excise	Fourth excise	Fifth excise	
20th October	3.67 a*	26.00 bcd	83.33 h	60.83 fg	63.33 g	47.33 c
27th October	7.67 ab	8.33 ab	49.67 efg	42.67 def	38.00 cde	29.27 b
3rd November	6.67 ab	64.00 g	64.00 g	54.33 efg	44.33 def	46.67 c
10th November	4.00 a	11.00 ab	7.00 ab	21.67 abc	6.67 ab	10.07 a
17th November	3.33 a	3.67 a	5.67 a	12.00 ab	16.00 ab	8.13 a
Mean	5.07 a	22.60 b	41.93 d	38.20 cd	33.67 c	

* Figures with common letter do not differ significantly at 5% level as per DNMR test.

of more number and long root, may be due to dryness of the older roots which became non-functional to some extent (personal observation).

On the basis of the results, it is suggested that in Bangladesh condition marcotting may be done starting from 20th October to 3rd November in order to develop maximum number of roots (Figures 1 and 2). Excising should be performed in between 3—4 weeks after marcotting for better survival of stalks, the prime need for healthy seed setting.

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